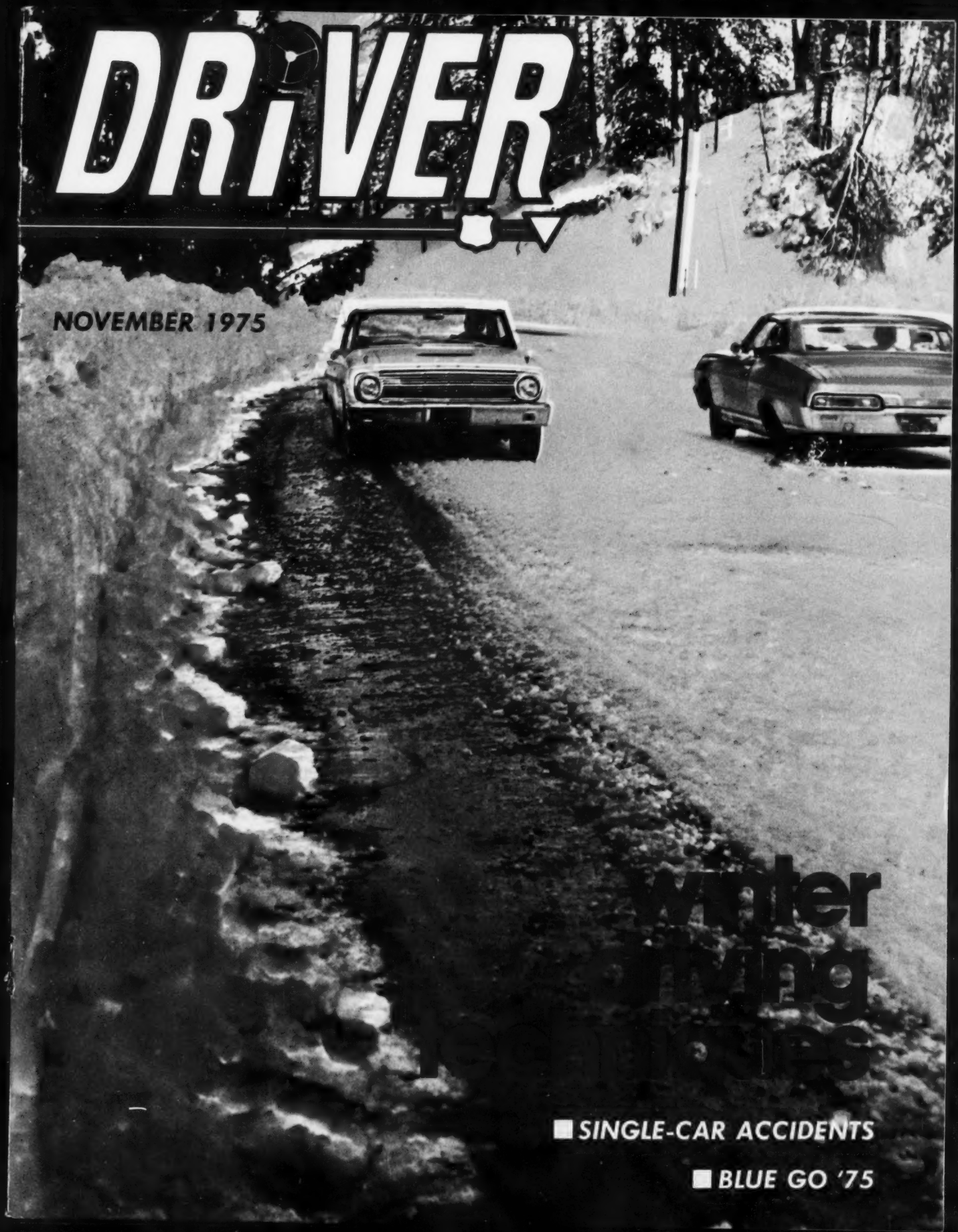
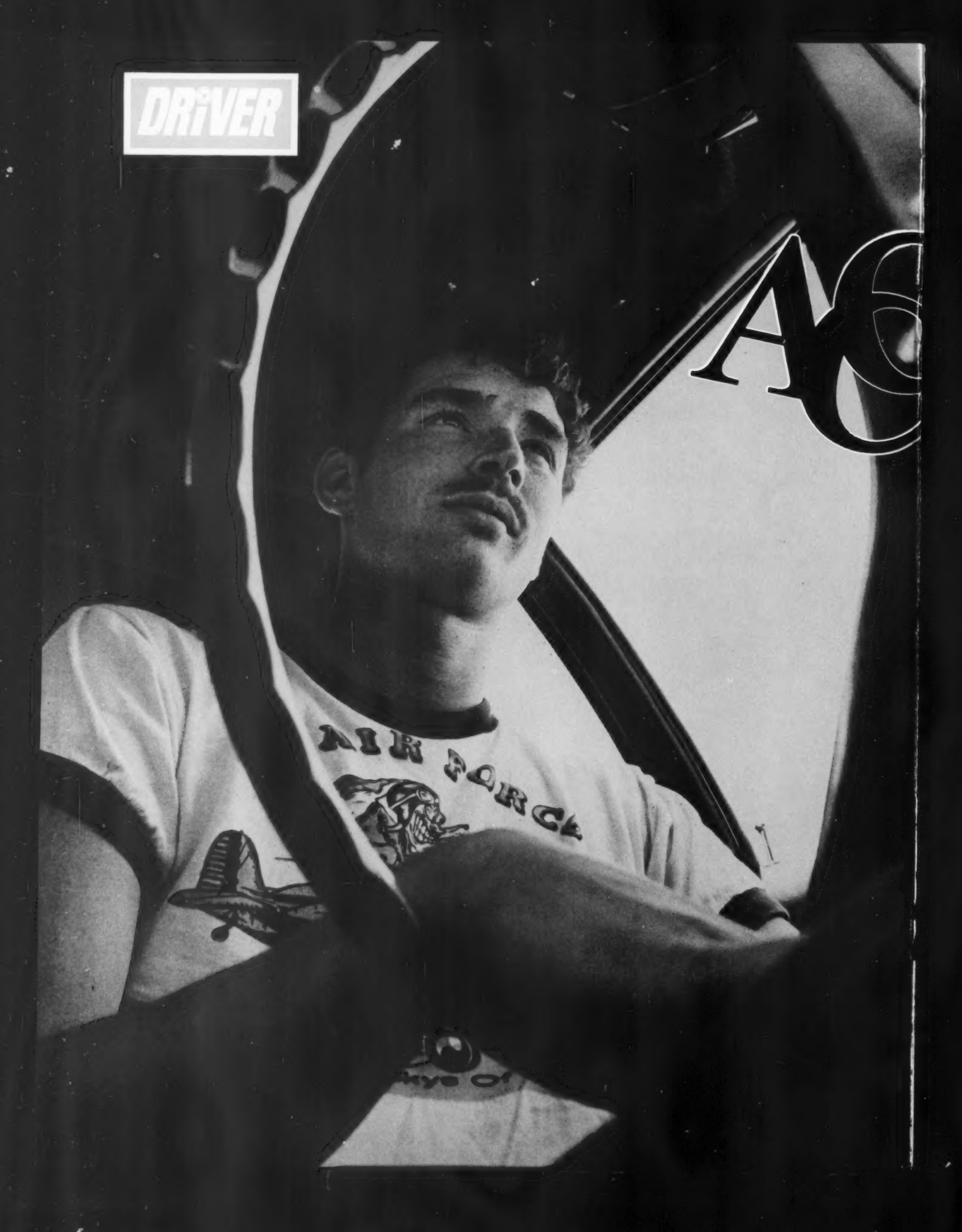
DRIVER

NOVEMBER 1975



winter driving

- SINGLE-CAR ACCIDENTS
- BLUE GO '75


DRiVER
AIR FORCE

Single-Car ACCIDENTS

They're frequent and they're serious. But you can avoid them if you want to.

Thousands of drivers in this country have been doing something that seems very strange. For no apparent reason, they drive off the road and into a solid object. Sometimes a tree or a utility pole. Maybe a bridge abutment or a wall. Once in a while right into a cow minding her own business in her own pasture.

They do it day and night, good weather and bad. Sometimes in traffic, but frequently when they are all alone on the road.

Most of us think of a traffic accident as a collision between two or more vehicles where one driver is the guilty son-of-a-gun and the other people are just innocent victims who couldn't get out of his path. Well, two out of every five accidents don't happen that way at all. Just one driver is involved.

These single-car accidents have been happening for almost 80 years but until recently nobody could figure out exactly why. They were referred to as "mystery" accidents. Some engineers thought that with the increased use of freeways and turnpikes over the past 20 years, there wouldn't be so many single-car accidents. But actually they have *increased* with the use of freeways. In fact, more than half of the fatal accidents on freeways today occur when a single vehicle runs off the roadway.

"One for the road!" are famous last words preceding many single-car accidents.

If a driver survives a single-car accident, he usually says "I lost control!" But why did he lose control? Or why did he give control away, as is more often the case?

Since investigation and research methods have improved so much during the past few years, the traffic safety people don't think of these single-car accidents as mysterious any more. They know now that there are definite reasons why a driver suddenly leaves the road to collide with something.

CARELESSNESS

Obviously, careless driving is a big reason for single-car accidents. And speeding is probably the leading form of carelessness.

continued

DRIVER

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

NOVEMBER 1975

VOLUME 9 NUMBER 6

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Certain individuals shown in this magazine are not members of the Air Force and therefore do not conform to Air Force grooming standards.

THE EDITOR SPEAKS

DOUBLE CLUTCH

MOTORCYCLE REGISTRATIONS

We had occasion to visit the California Department of Motor Vehicles not long ago to register a car. While there we noticed two young individuals on motorcycles trying to pass the Motorcycle Licensing Test. After the examiner had told them they failed, they seemed extraordinarily upset. Since we had the same trouble a few years ago, we went over and asked why they were so worried about being unable to pass. The two replied that they were airmen and since they couldn't pass the State Test they probably couldn't pass the base motorcycle test and wouldn't be able to register their bikes on base.

They were not entirely correct, and since there have been some misconceptions about the Air Force Motorcycle Program in the past, we decided it was time to help set the record straight.

Despite what you may think, the Air Force Motorcycle Program was *not* designed to harass, embarrass or discriminate against motorcyclists. It is intended to be an accident prevention and operator education tool *only*.

The same theory applies to the motorcycle registration procedure. It is not intended to be, nor should it be, punitive in nature. It is used for the same purpose as four-wheel vehicle registration; to control access to the base.

continued on page 28

NEXT MONTH
Maximizing Mileage

Rumble strips—rows of reflectorized buttons between lanes and along the paved shoulders of many of the nation's highways—are believed to be the most effective device ever developed to alert tired drivers to the danger of running off the roadway. But overcorrecting the steering once a driver "wakes up" and sees his danger remains a human problem.

This can be the beginning of a single-car accident. The right wheels are off the pavement and scrubbing the edge. You have to get back on the roadway before you drive into a telephone pole, but don't wrench the wheel hard left or you'll get more action than you want. Slow down.

continued
SINGLE-CAR ACCIDENTS

Last year, three out of four deaths in single-car accidents happened in rural areas. (That doesn't necessarily mean country roads because thousands of miles of freeways and expressways run through rural areas.) Maybe a big factor here is that traffic officers don't patrol roads in rural areas as heavily as in urban. Even the best of us have been tempted to punch it when we're alone on a beautiful stretch of pavement and we know there isn't a patrolman within 15 miles.

Another form of carelessness is just plain showing off. Sometimes we show off for other people but often it's just for ourselves. Ever say to yourself, "that long, curved exit ramp is marked for 35 mph, but with that terrific banking I'll bet a good driver in a good car could take it at least twice that"? Well, don't try it. Road designers say it just isn't so.

Failure to use seat belts is another form of carelessness. Many deaths that occur in single-car accidents at less than 60 mph would have been minor injury reports *if* the driver had been wearing restraints.

ALCOHOL

You knew this one was coming. Alcohol, year after year, plays a part in one of every two fatal accidents in this country. Every place we look, we find studies confirming the size of the problem.

Last year a medical school examined 2,000 dead drivers. Half of them had been drinking prior to the accident and 500 of the 2,000 had been legally drunk! That's a lot of liquor on the road.

Believe it or not, between midnight and 3 a.m., when roughly one in five fatal accidents happen, 83% of the dead drivers were legally drunk when the accident occurred! Newspaper and magazine articles often make a big thing of the fact that so-called social drinkers are involved in more accidents than

continued

Long drive ahead—let's hit the road!

The hours, miles tick slowly by.

continued

SINGLE-CAR ACCIDENTS

are the really drunk drivers. The answer to that is *naturally*. After all, there are a lot more social drinkers. It is interesting, however, that the drunk driver's accident is more likely to be fatal.

OTHER DRUGS

Although alcohol is the most abused drug, there are many others that can set you up for a single-car accident. The cerebral stimulants – pep pills, bennies, speed, or uppers – are dangerous. While an amphetamine may increase wakefulness and efficiency for a short time, dizziness, headache and jitters can follow.

An innocent driver may have a drug-related accident because of medication. For example, a 22-year-old Vietnam veteran fell asleep at the wheel, ran off the road, smashed into a tree, and overturned. His injuries were fatal and the police suspected alcohol. But a medical investigation turned up the fact that the man was taking an anti-malaria drug which had probably made him drowsy. If a doctor prescribes medicine, he should tell you if it will affect your driving ability. If he doesn't volunteer the information, ask. It's your life, not his.

Traffic safety specialists are beginning to think that drugs are responsible for a great many single-car accidents. About 10% of all prescription drugs have some kind of psychic effect – they change the user's mood and mental processes. One of every four Americans takes some kind of drug each day. Muscle and tension relaxants, such as tranquilizers, are prescribed by the millions. If you take them, remember they will slow your reflexes and can cause you trouble on the road.

If you combine alcohol with another drug, you can produce a really dangerous effect known as "synergism." This simply means that the combined effect of the two drugs is greater than the sum of the effects taken independently. Synergism is by no means a rare occurrence. Several famous people in the entertainment world have died in recent years when they combined a prescription drug with a relatively small amount of alcohol. Either one would have been harmless without the other.

FATIGUE

Drowsiness and fatigue are often related to alcohol and drugs, but they can hit you simply because you have over-extended yourself. Natural fatigue is so common among young drivers that they tend to accept it as the usual thing. It affects steering wheel reversal rates, speed change rates, and average speed of the vehicle. As fatigue grows, the driver accepts wider tolerance of vehicle tracking and speed, he's willing to take more risks, and he grows careless.

Experienced drivers have their own remedies for drowsiness and fatigue. They stop for coffee, sing out loud, eat candy, or suck ice cubes. If you are physically tired, none of that will help for long.

Some interesting experiments relating to this problem have been conducted lately. In Buffalo, N.Y., 30 tired drivers were paid to make long, dreary night runs with computer electrodes strapped to their heads and over

Straight-ahead stare . . . highway hypnosis.

Getting drowsier by the mile.

their hearts. Thirteen times, the drivers actually fell asleep at the wheel.

The road tests were run night after night on a fast New York State Thruway. Drivers who had already put in a hard day's work and were tired would squirm, kick the floor, switch on the radio, stretch, and despite all, finally drop off, still holding the wheel, their feet still on the gas pedals. In 12 of the 13 cases where the drivers fell asleep, they veered onto the shoulder and the different sound of the road surface awakened them in time to realize danger. In the thirteenth case, the accompanying psychologist had to grab the wheel and slam on his own special emergency brake to control the car.

If your body is physically exhausted, the only safe thing to do is stop and rest. If you are growing drowsy simply from boredom and being confined in one position, then there are tricks that will help you stay awake. Play the radio, but find a talk show instead of soothing music. Don't drive very long near noisy trucks – loud noises lullaby you. Even awake, you lose steady steering control.

Long-distance truck drivers have their own list of do's and don'ts for fighting off sleep:

■ Look for landmarks. Merely passing a big city is interesting, and lights of cities miles away can banish "drowsy waves."

■ Stop frequently. It's not necessary to eat at every stop. Walk around, jog, check the tires, wipe off the windshield and lights, talk to other people.

■ Take along a passenger, even if he's asleep beside you. Just having him there helps.

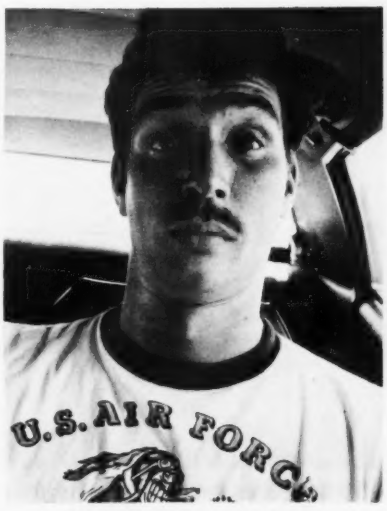
■ Don't gulp a cup of coffee and expect it to keep you awake the next hundred miles. Truckers say coffee only helps a few minutes.

■ Lay off anti-sleep pills. Truckers who use them are feared by others. "We call them

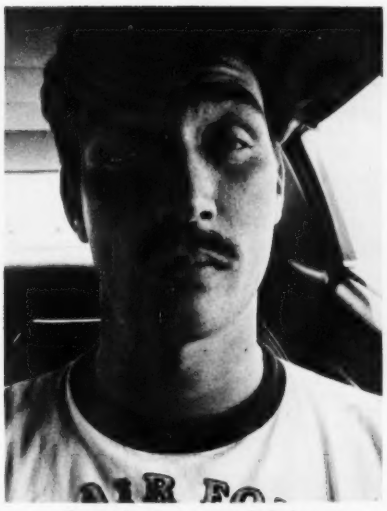
continued

Fatigue sets in insidiously.

Shouldn't be much farther to go.



Got to keep those eyes open.



Drowsiness is overwhelming.

Eyes droop shut—hope the road has a rumble strip.

It doesn't. Too late now!

But part of your mind has gone out to lunch – the analytical, critical, *thinking* part.

You can become self-hypnotized on any stretch of road, but freeways are more likely to bring it on. Relatively straight stretches and the absence of interesting scenery promote this dangerous mental condition. So does staring at the road and sitting in one position for long periods, listening to the smooth drone of the engine and the hum of the tires.

As General Motors test driver David Girling told us, "You've won half the battle

continued
SINGLE-CAR ACCIDENTS

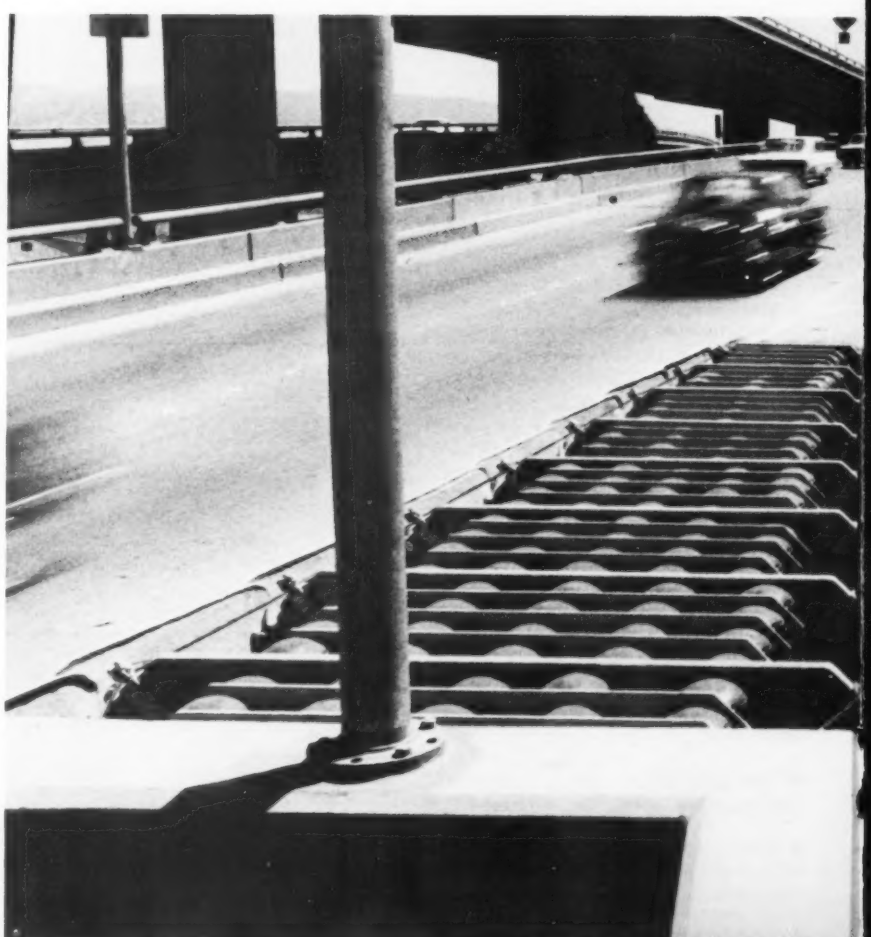
goofball drivers," says one. "They hallucinate – see things that aren't there."

- Be on guard if you find yourself drawing in long, weary breaths, getting mad at other drivers, or making foolish mistakes like stopping at a green traffic light. These are signs of genuine fatigue.
- Don't eat a big meal – it brings on sleep.

Fatigue is probably second only to alcohol as the cause of most single-car accidents in the military. Service people often drive long distances on weekend passes or on leaves and furloughs, starting their trips at the end of a workday and driving 200 to 300 miles before stopping. If you feel you really must do this occasionally, take someone along to share the driving and help stay alert.

HIGHWAY HYPNOSIS

Long-distance driving can be a real bore, and maybe that accounts for "highway hypnosis" – a kind of sleep-walking on wheels. The greatest danger here is that you may look alert. You may think you're alert.



Underestimating your vehicle's speed in approaching an off-ramp is a major cause of single-car accidents on the nation's freeways. One way to help prevent fatalities in such crashes is this "water bumper" on the Northern Oakland Bay Bridge. Engineered to cushion the impact of vehicles whose drivers wait too long in deciding to go left or right, it is made up of 16 feet of water-filled vinyl cylinders.

against highway hypnosis if you know there is such a thing. This is especially important for new drivers who haven't been exposed to long-haul driving. Be convinced that it can happen to you, even after only a few miles of driving."

To beat it, Girling suggests a few tricks in addition to those we've already mentioned for drowsiness. For instance:

■ Keep your eyes moving to avoid that fixed stare. A good driver checks his rear-view mirror every few seconds, regardless of where he's driving. Check your instruments from time to time. Keep sweeping your eyes across the scene before you. Drive ahead – keep on top of what's going on farther down the road.

■ Vary your speed every 10 or 15 minutes, and don't follow one vehicle too long. Getting too accustomed to something is a hazard in itself.

There's a side-effect of long-distance driving that's a first cousin to highway hypnosis. After you've driven a while at highway speeds, you become "velocitized." This means that you may be driving along at 60 mph, but it feels more like 35. You can plow into the driver ahead of you if he suddenly slows down. You may take a curve too fast, suddenly find yourself "on top" of a stop sign, or leave the road while trying to exit a freeway off-ramp.

That may be the reason there are more accidents on off-ramps than on-ramps.

EMOTIONAL FACTORS

A large number of single-car accidents are believed to be caused by emotional stress. Such things as family arguments, disagreements with the boss, clashes with fellow workers, and bad performance ratings can take your mind off your driving. The Air Force has known for years that emotional factors can cause aircraft accidents. If a trained and disciplined professional pilot can fall into that trap, we can be sure we drivers are going to do the same.

It doesn't take a lot of stress to turn an otherwise good driver into a dangerous one, even suicidal in some cases. Psychiatrists say that when a person is angry, the extra adrenaline pumped into the bloodstream can increase the heartbeat as much as 40 beats a minute. This heightened activity, perhaps in the form of an overly quick reflex, could cause an accident.

More often though, emotional problems simply distract us from the driving task so that we aren't paying attention to what we're doing.

Professional truck drivers with a history of traffic accidents are often found to lead troubled lives. Taxicab drivers with bad accident records are listed more often in the records of city courts, social agencies and bill collectors.

It is easy to say "don't worry while you're driving" but it's not easy advice to follow. At least try to be aware of the danger of giving your mind over to anger or other emotion when it should be concentrating on the job at hand.

MECHANICAL DEFECTS

Very few accidents are caused by mechanical problems with the car. The Department of Transportation figures fewer than one in 20. But DRIVER suspects the problem could be a little greater with our readers because young service members don't always have money available for proper maintenance of their vehicles.

That's why our Backyard Mechanic wants you to learn as much as possible about your car. If you don't do maintenance yourself, you should at least know enough about the mechanics of your vehicle to avoid paying too much for repairs you hire done.

If there's not enough money for a weekend of fun *and* a brake job, there's no sense feeling sorry for yourself about what has to come first in the budget. Incidentally, after bad brakes, faulty steering is the most commonly observed mechanical defect leading to accidents.

YOU'RE IN CONTROL

There you have the reasons for single-car accidents. The only cause factor we haven't mentioned is physical – the driver who has a heart attack at the wheel, for instance. That's not likely to happen to you and there's not much you can do about it if it does.

All the causes we've discussed here – carelessness, alcohol and other drugs, fatigue, highway hypnosis, emotional stress, mechanical problems in the car – are things over which you have control. Whether or not you exercise that control is up to you.

BLUE GO '75

Racing on an Air Force Base! Never happen, you say? Then what's that C-141 doing on the parallel taxiway?

A Chevelle named the "Big Red Machine" moves up to the starting line in a series of controlled lurches. An Army E-4 standing next to the spectator fence remarks, "The *?!!&*! looks like a jackrabbit on a tether . . ." "Big Red" is in place now and the spectators' eyes move to the near lane where a stock-appearing Mustang glides silently into position beside the Chevelle.

The spectators, most of them in fatigues, cheer and clap because it'll be Ford vs Chevy and the Ponycar doesn't seem to have a chance. Then comes the sound of a starter motor under severe strain . . . a "pop" from the Mustang . . . another "pop" from the Mustang . . . then an amazing thing. Waves of sound crash across the stands; the Ford partisans stand and scream with victory fever.

The 'Stang is so far from stock it's incredible. It's powered by a 429 cubic inch SOHC (Single Overhead Cam) Ford "monster motor." The driver of the 454-cubic inch Chevelle now realizes this isn't gonna be as easy as he thought. Both machines are now "staged", or even, at the starting line and the amber lights on top of the "Christmas Tree" starting system glow wickedly. Each driver brings up his engine rpm to the proper point on the tachometer.

The noise is unbelievable. You not only hear it, you *feel* it. The engines together put out nearly 1000 horsepower. The cars shake from side to side, nearly picking up one wheel and then the other because of the massive amounts of torque. When the Christmas tree lights turn green, all --- breaks loose! The drivers' adrenalin flows, their accelerator pedeals go full down, engines thunder into max power and rear tires give off huge clouds of smoke.

They leave the line as one, noses up because of the sudden weight transfer to the rear. This is really gonna be a drag race! Then, suddenly, the Chevelle falters and slows. The driver brings it to a stop 100 yards down the strip and rests his forehead on his steering wheel. The Mustang runs 1320 feet, and trips the "win" light.

The stands are quiet; too quiet. They realize something broke in the Chevelle and weeks, even months, of preparation are shot. A zero return on a large investment of time and money. The wife of the driver of "Big Red" is quiet, too. She realizes that, depending on what broke, household expenses will have to be shaved a bit (or a lot) until the car is race-ready again.

Drag racing is an "ER" sport: BiggER, fastER, loudER, than almost any other sport. It's a sport where superlatives are common. Fantastic, unbelievable, incredible – all these apply, at one time or another, to drag racing. Drag racing is also uniquely American in origin, unlike most other forms of automobile competition. It started here, blossomed here, and it is here that the best drag races in the world live.

But, let's get back to basics. If you

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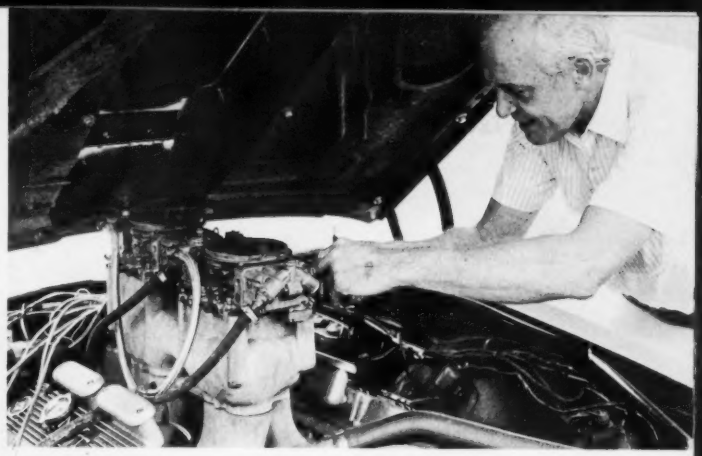

(above top)
The owner of this car knows what's happening. He understands that fuel doesn't have to be inside a combustion chamber to burn. A broken fuel line, defective carburetor, or a backfire through the carburetor can be nasty. This dry chemical type extinguisher won't blow burning gasoline all over the place as a CO_2 type can.

(above)
Dan Broyles checks the scales. Each wheel is weighed individually. The total is checked against NHRA specs and the car assigned a power to weight class. The individual weights are used to determine if improper or illegal chassis mods have altered the weight transfer or handling characteristics. Dan also does the tech inspection required prior to racing, checking wheels, tires, suspension, steering brakes, engine and a host of other items. The tech inspection is primarily for safety and not for illegal mods. If a car is protested, another team of inspectors checks the car out after the race.

(above top)
Joe Rein, 55, proves that dragging isn't exclusively a young man's sport. In this posed photo, Joe adjusts the throttle linkage on his (slightly modified) '69 Camaro. Joe got into dragging when his son, an Army Spec 5, bought the car in '69. His son lost interest but Joe was hooked. Now *he* drives while his son sits in the stands. Senior Power!

(above)
He had a dream about winning. It came true, too! Buster Jackson took first in the modified division. The "Soul Shaker" Camaro is really serious about winning—note the "wrinkle-wall" slicks attached to the wheels with security bolts. This prevents blowouts caused by the wheel spinning inside the tire. Also, check out the wheelie bars. This car has enough power to lift the front wheels for a goodly distance so wheelie bars are used to help keep the front end where it belongs—on the ground!

(right)
A rare bird moves to the staging area. This Falcon Sprint is spinning the rear wheels causing the tires to heat up. In drag tires, the rubber compound functions better at high temperatures, hence, "burnouts." At some strips, a "burnout box" or bleach box is provided. When you burn out through a puddle of bleach, you not only create clouds of smoke to keep the fans happy, you actually clean the tires for better traction.

don't know what a drag race is, try this brief explanation. It's a race, from a standing start, between two vehicles and drivers. The distance is usually a quarter of a mile, and the one who gets there quickest wins. Notice that it's "quickest" not "fastest." Driver No. 1 may have a higher speed than his opponent, but if No. 2 has a lower elapsed time (e.t.), say, a 14.40 second run as opposed to No. 1's 14.45, then No. 2 wins.

If you've never been to a drag race, you may be missing some real excitement. DRIVER has been to drag races, lots of them, but our favorite is still the annual March of Dimes benefit race held by the Strato Rods Racing Association at McGuire AFB/Ft. Dix, New Jersey. SRRA holds races every Sunday during the normal racing season, but this September event just seems to bring out the best crowds, *and* the best racers.

The Strato Rods have been in existence for 10 years and have held the March of Dimes race for the last six years. Their dragway is an unused concrete taxiway adjacent to Ft. Dix. SRRA operates under the guidance of Special Services with McGuire AFB providing the taxiway, ambulance, and fire protection. Past base commanders and the present base commander all actively support the Strato Rods.

There are several reasons for the Strato Rods' base endorsement, and the primary one is safety. Automobile competition in any form has inherent dangers and the only way to eliminate these dangers is control. Competitor control, crowd control, facilities control, etc., all are easier to accomplish on a military installation. Civilian "outlaw" tracks still exist, and GIs still want to race, so why not have the race where the situation can be closely monitored?

Another reason is that on military installations there are many race fans, and often little money among them. The Strato Rods Dragway is within walking distance of both installations, and admission and competition fees can be kept to a level affordable by all service members. That's a large plus when you consider it usually costs $12 to $14 just to see a civilian race.

Still another consideration is that, although civilians are permitted to race, it's primarily servicemen racing against servicemen. That can be a great morale builder ("Hey, I *beat* that guy from 2nd Batallion"), and often a squadron will back a particular car and driver in competition. It's also neat to get the occasional chance to line up against your section chief, for instance, and beat him. Drag racing knows no ranks. It's just driver skill and car preparation.

SAFETY, SAFETY, SAFETY

What DRIVER's editors and readers really like to see is safety, and it's in abundance at the McGuire drag races. All cars competing in SRRA races *must* meet NHRA (National Hot RodAssociation) safety specs. This means cars are equipped with scattershields in case the clutch/flywheel or torque converter explodes, fire extinguishers, drive shaft loops, and security bolts for rear wheels and tires. Depending on the class the car runs, rear axle retainers, roll cages, and fire retardant driver's suits may be required.

In addition to NHRA rules, SRRA adds a few of its own. For instance, no pit racing (and that includes the return road, too) whatsoever, and the rule that if you've been ticketed for street racing you don't race on the Strato Rods' strip.

Fire equipment is available for both grass and fuel fires, and an ambulance and qualified medical technicians are supplied by the base hospital. As we mentioned, SRRA works closely with the base and the support and cooperation are outstanding. In addition, SRRA is affiliated with and sanctioned by NHRA.

A WORD FROM J. D.

J. D. Walker is president of the Strato Rods Racing Association. A C-141 crewmember is young, aggressive, and wants the best for the club and its members J. D. has been drag racing for 15 years and has owned five drag cars. His latest is a Chevelle powered by a 454 cubic inch engine.

J.D.: I've been racing a long time now and I can tell you it's really a pleasure to have an on-base club and drag strip. In the past, I've had to tow or trailer the cars a long way to get to race, and it cost an arm and a leg to compete. This

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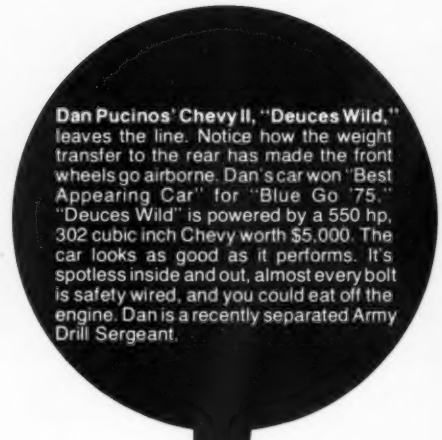
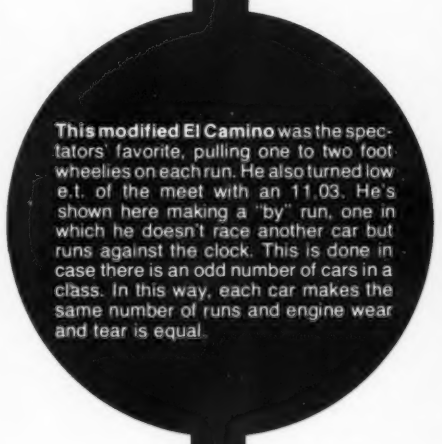
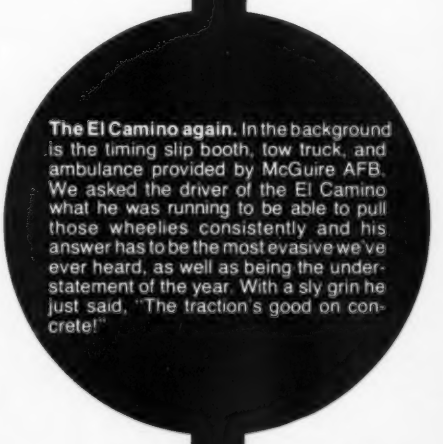


Dan Pucinos' Chevy II, "Deuces Wild," leaves the line. Notice how the weight transfer to the rear has made the front wheels go airborne. Dan's car won "Best Appearing Car" for "Blue Go '75." "Deuces Wild" is powered by a 550 hp, 302 cubic inch Chevy worth $5,000. The car looks as good as it performs. It's spotless inside and out, almost every bolt is safety wired, and you could eat off the engine. Dan is a recently separated Army Drill Sergeant.



This modified El Camino was the spectators' favorite, pulling one to two foot wheelies on each run. He also turned low e.t. of the meet with an 11.03. He's shown here making a "by" run, one in which he doesn't race another car but runs against the clock. This is done in case there is an odd number of cars in a class. In this way, each car makes the same number of runs and engine wear and tear is equal.



The El Camino again. In the background is the timing slip booth, tow truck, and ambulance provided by McGuire AFB. We asked the driver of the El Camino what he was running to be able to pull those wheelies consistently and his answer has to be the most evasive we've ever heard, as well as being the understatement of the year. With a sly grin he just said, "The traction's good on concrete!"

RAGWAY
GUIRE A.F.B. NJ
1072 D/MP
Deuces
MOTORS

Strato Rods
DRAGWAY
McGUIRE A.F.B. NJ

DRAGWAY
McGUIRE A.F.B. NJ

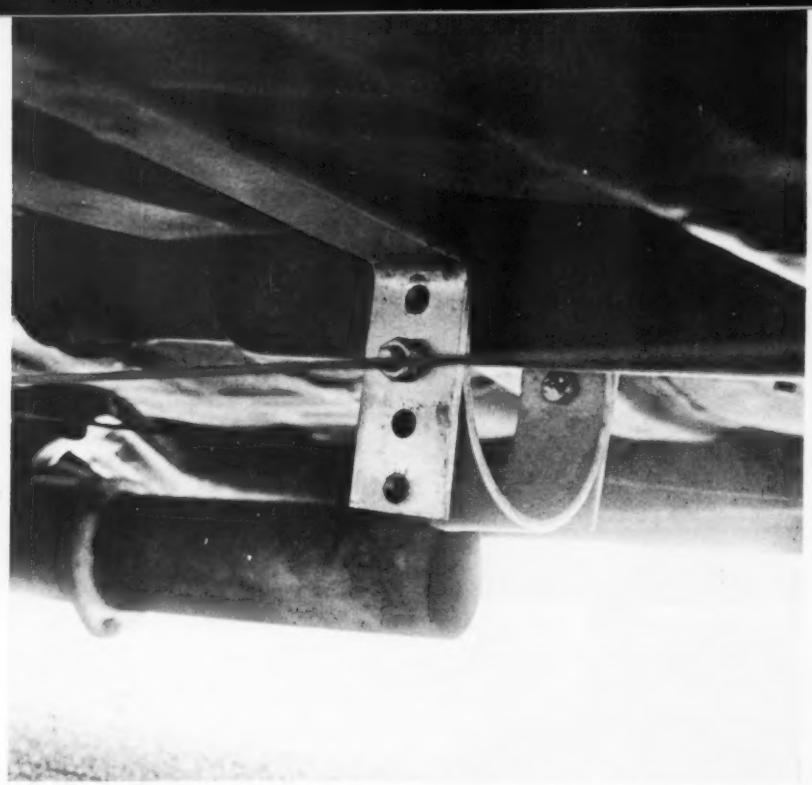
is a whole new ball game. The competition is good, since most of us are GIs and we all have about the same amount of money to spend on our cars. There really isn't anybody here who can put $10,000 into a car. We don't have many "professional" racers come out – you know – speed shop-sponsored cars, etc. We're all about even. Even the guy new to dragging has a good chance to win here.

DRIVER: What is your position on street racing?

J. D.: Well, you know the club's position. One ticket for street racing and you're out. My feelings go a little deeper. I can think of a thousand reasons against it. Opposing traffic just where you don't expect it, curves, cars backing out into the street, ambulances responding to calls, bad lighting – you name it, it's all on the street. And, of course, there's always the possibility of a child wandering into the street. Another thing that makes the strip a better place to race is that you can make your concentration work for and not against you. On the street you need all your concentration just to avoid hitting or being hit by someone. On the strip you can funnel that concentration into just one channel. You can watch the tach for correct shift points. You can have a hand on the shifter. Basically, all your senses are plugged into the car and your performance is much sharper and better. Also, none of our members ever got ulcers worrying about where the police were. Really, though, most street racers would behave differently if they had children.

DRIVER: We've seen a lot of cars on the street with hacked-up rear ends. Is there a valid reason behind this?

J. D.: Well, certainly from a racing standpoint there isn't. The rakes you see on drag cars are caused by lowering the front end, not jacking the back. We do this for two reasons. One, it lowers the center of gravity for better handling and, two, it aids in weight transfer. The devices sold for jacking street cars usually cause adverse handling, and that's about all they do.



This is one of the things tech inspectors look for—it's a drive shaft loop. Should the drive shaft or universal break, this loop will keep the drive shaft from falling down and digging into the pavement, thereby preventing a really nasty experience. Notice that this loop isn't exactly made out of sheet metal! The racers themselves take steps to insure a broken this or that won't become a hazard.

DRIVER: Do you use seat belts, J. D.?

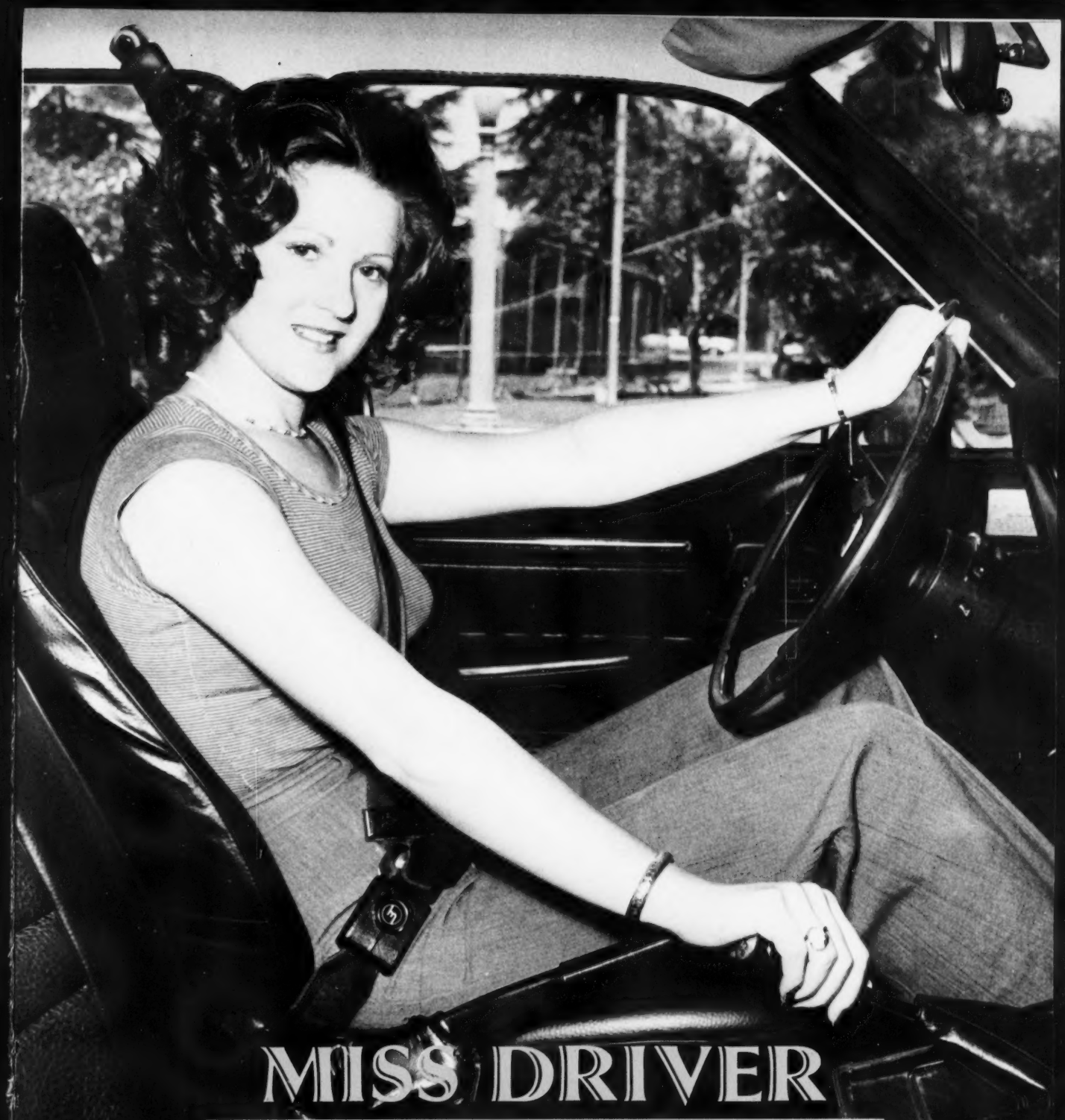
J. D.: Yeah. I just kinda got in the habit because you gotta wear 'em when you're racing. It just seems natural to use 'em all the time. I remember seeing pictures of Larry Reyes' accident. He flipped Roland Leong's funny car at 180 mph and slid over the finish line upside down and backwards, then flipped again. The body, chassis, and engine were *totally* demolished. The only thing intact was the driver's roll cage and the only reason Larry stayed in the roll cage was safety belts and harness. You see something like that and you gotta turn into a believer.

DRIVER: How would a person get involved in drag racing?

J. D.: All it takes to start is a car, a helmet, and $5 entry fee. Today, "bracket" racing is becoming popular. These bracket races offer equal competition to *all* cars, even the dead stock street cars. When you run brackets, *you* pick the time you'll turn, so if your car will make it a quarter of a mile, you've got just as good a chance as anybody. From there, you get to know the guys, and from them you learn about different classes and can determine if you want to hot-up your street car or go with a competition-only rig. There's no pressure and *you* decide how "fast" you want to spend. To me, there's no sport as fascinating or exciting, for both the spectator and the participant, as drag racing. *I'll* never quit dragging, and my wife doesn't even get upset anymore when she sees an engine disassembled on her kitchen table!

"BLUE GO '75"

Well, DRIVER had a good time and learned a lot at the Strato Rods big meet. The racers had a good time, too. Some of them won money, some won trophies, but the big winner was the March of Dimes. The Strato Rods gave them a $1,000 check! "Blue Go '75" is history now, but we'll bet there will be some frantic activity in the Ft. Dix and McGuire auto hobby shops this winter.



MISS DRIVER

"Everytime I get in my car, I take an extra three seconds to fasten my seat belt-shoulder harness. How about you? Do you know that if *everybody* buckled up *every time*, we could save 15,000 lives a year in this country? If you don't always use your belts, try it for a week. At the end of that time, it will be as automatic as putting the key in the ignition. And you won't have wasted more than a minute doing it the whole week."

Sandra Jorgacs

In the October DRIVER we talked about winterizing cars. If you haven't prepared your car for cold weather yet, how about checking the tips in that issue?

If you've ever been in a place like Fargo, N.D., or Duluth, Minn., during the first storm of winter, you know how people forget the *feel* of driving on snow and ice. Even those folks born and bred in the cold country have to get used to wintery roads all over again every year.

So—no matter if you're a brand new driver spending your first winter north of Georgia or an old hand from Bozeman, Mont.—now's the time to finish winterizing your car and start winterizing your driving.

GO GENTLY

If there is one word to describe good winter driving techniques it is *gentle*. When driving on snow or ice-covered roads, practice *gentle* acceleration, *gentle* braking, *gentle* maneuvering. Try not to break the very tenuous traction between tires and slick ice, packed snow, loose snow, even just plain wet pavement. If you accelerate too hard, the drive wheels spin and can polish the surface under the tires even more.

Go easy when you stop. Allow yourself room to begin stopping sooner than you do on bare pavement. Remember to brake gently, not hard. If your wheels do lock and you start to slide, pump the brakes. This allows the wheels to turn and provides a measure of steering control. If the wheels are locked, momentum will just carry the vehicle in the direction it is heading—straight down the road, off the road, or into on-coming traffic. No amount of steering-wheel action will change the direction.

Allow greater following distances in all slippery driving situations. Double, triple, quadruple bare-pavement following distances. Even at 20 mph, you can use up 10 times more stopping distance on ice than on dry pavement. Be *highly defensive*.

STAYING OUT OF SKIDS

Most young drivers say the thing they fear most in winter is skidding. Although reading about it isn't the same as actual in-the-car training, thinking it through in advance can help you. Here's how to stay out of a skid in the first place:

1. Keep the speed of the car well below dry-road speed.
2. Keep the car pulling steadily and take curves cautiously.
3. Avoid any sudden turning, swerving or braking.
4. Drive smoothly, and accelerate and decelerate slowly.
5. Don't drive on road edges and shoulders.
6. Don't change to a lower gear on slippery surfaces at too fast a speed.

STOPPING A SKID

1. Should you find yourself in a skid, try hard not to panic. You must keep calm to take corrective action.
2. Take your foot off the gas gradually. Some expert drivers accelerate moderately to get out of a skid.
3. Keep off the brakes; braking only makes the skid worse.
4. Steer into the skid by turning wheels in the direction in which your rear wheels are sliding.
5. When the car comes out of the skid, straighten your wheels and pump brakes gently to slow down.
6. Avoid oversteering. Turning the steering wheel too far whips the rear end into a skid in the opposite direction. Counter-skids can occur several times on a really slick surface. Don't give up.

Skid correction calls for heads-up effort on the part of the driver, but that's what good driving is all about the year round.

WATCH FOR ICE

Be careful of ice on otherwise bare roads. Patches may occur in shaded areas the sun can't reach—near clumps of trees, behind buildings, or under bridges. Sometimes the surface of a bridge or an overpass will remain icy when the surrounding roads have been clear for hours. If you see that you must drive over a patch of ice, try to do any braking you must do *before* you are on it. And while you're actually on the ice, avoid sudden steering maneuvers.

When you move your car after it has been sitting for a time in freezing temperatures, don't squirt windshield washer fluid on the cold windshield right away,even if it's well laced with antifreeze solvent. The water content may freeze and the wiper will cause it to spread in an opaque sheet across the glass. Wait a few minutes until you can bathe the inside of the windshield with warm air

CONTINUED

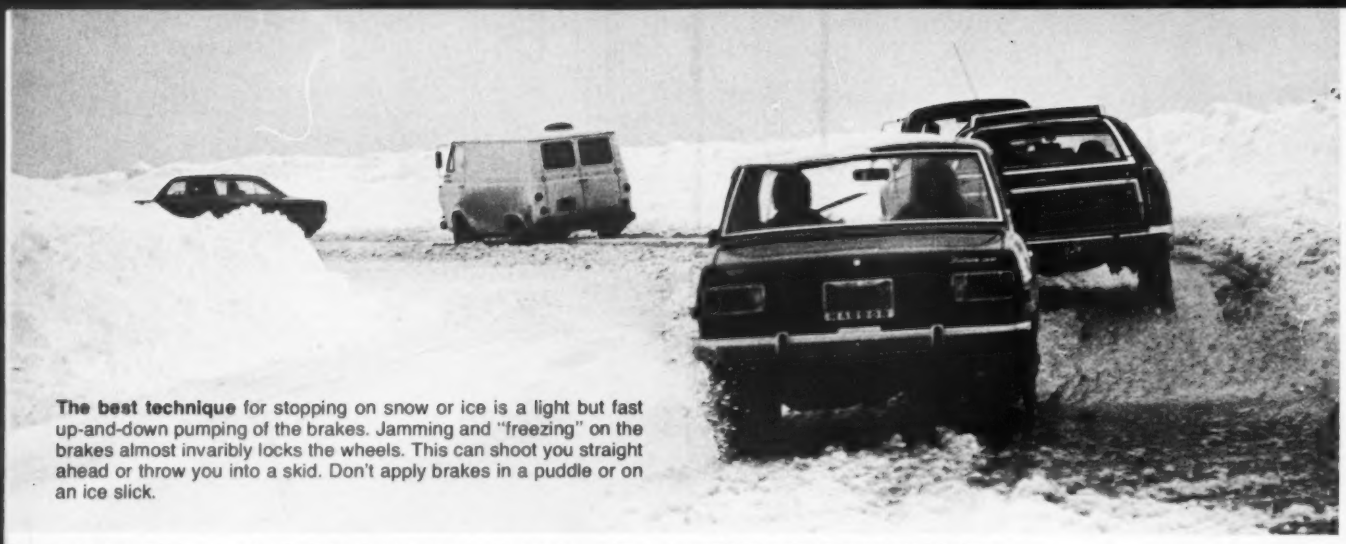
ER DRIVING

(left)
Start your car in a higher gear than usual on slick roads where traction is poor. (Start in "Drive" with automatic transmission.) Accelerate carefully—just enough to keep the engine from stalling. Avoid spinning the wheels. Ease slowly until traction is good.

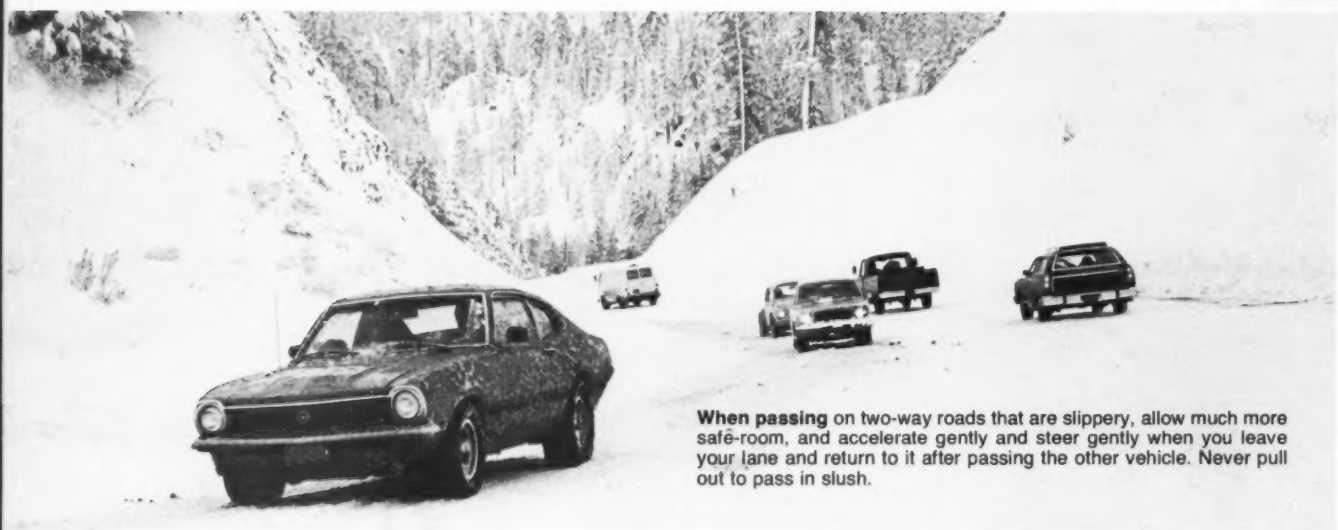
(below)
Try the brakes while driving slowly and when no other traffic is near. Find out just how slippery or slick the road is and adjust your speed accordingly.

TECHNIQUES

NOVEMBER 1975



The best technique for stopping on snow or ice is a light but fast up-and-down pumping of the brakes. Jamming and "freezing" on the brakes almost invaribly locks the wheels. This can shoot you straight ahead or throw you into a skid. Don't apply brakes in a puddle or on an ice slick.



When passing on two-way roads that are slippery, allow much more safe-room, and accelerate gently and steer gently when you leave your lane and return to it after passing the other vehicle. Never pull out to pass in slush.

continued

WINTER DRIVING TECHNIQUES

from the defroster. If the windshield needs to be cleared before you move the car, do it by hand using a scraper, brush, or whatever is necessary to do a thorough job. Don't clear one small patch and become a "peep-hole" driver.

Many winter accidents happen because so few drivers know that skidding in the snow and ice is more likely to occur when the temperature is at the freezing point or slightly above than on hard frozen ice. If ice is wet or melting because of rising temperatures, stopping distances are much greater.

When temperatures are low, it's a good idea to park the car in gear rather than using the parking brake. Slush accumulated while driving can freeze around the cables or rear brake shoes overnight, locking the emergency brake.

FUEL ECONOMY

Don't wait for the engine to warm up more than a minute or so before you get moving. Idling while making brief stops also wastes gas. So does a series of short trips that allows the engine to get cold between each stop and start, a likely occurrence on a winter's day. It's far more economical to plan ahead and keep short excursions to a minimum.

Watch your tire pressure. Tires four pounds below recommended pressure can cost you as much as one mile per gallon.

All the bad habits that reduce fuel economy in summer—jack-rabbit starts, sudden stops, rapid acceleration and hard braking in traffic—are aggravated by winter conditions. On bare pavement, roaring away from a traffic light can cost up to 1.6 miles per gallon. Ice and snow-covered roads offer increased rolling resistance that make these bad driving practices even more inefficient.

Year-round fuel savers like tune-ups and proper maintenance are even more critical to good gas mileage in cold weather because lower temperatures put a greater demand on every vehicle system. At least it's encouraging that heaters and defrosters require less energy to operate than air conditioners. Unfortunately, this savings can be offset by the greater use of headlights in winter.

TRIP PLANNING

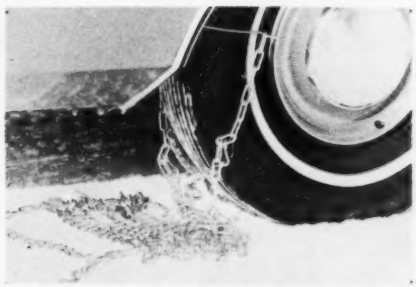
Research your winter trip, whether it's a hundred miles or a thousand. Know the route in advance and try to make a realistic estimate of how much distance you can cover in a certain time. Don't count on making the same mileage you do in good weather.

Before you leave, check the regional weather forecasts. If the reports are not favorable, don't hesitate to check further with police or automobile clubs about current road conditions along your planned route, especially

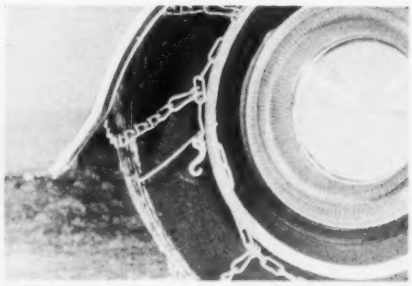
EASY WAY TO APPLY TIRE CHAINS

With a little "know-how" and practice, it can be done in 6 minutes, without a jack and without getting your clothes dirty.

STEP NO. 1 Spread the chains on the ground behind the rear wheels to remove tangles. Hooks should be to the rear. Reinforced chains are best and the projecting teeth or cleats should be facing up.

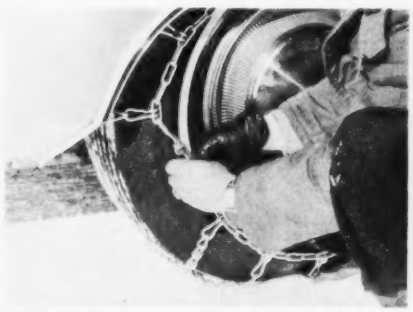


STEP NO. 2 Gather the chains behind the tire so they won't catch the fender, and attach the end links to the "chain applier," a simple spring steel wire that is easily slipped onto the tire.



STEP NO. 3 Drive the car forward about one wheel revolution, so that the applier carries the chains around the tire.

In-car training like this is the best way to learn skid control. Since we don't all have that opportunity, the next best thing is reading about it. Most skids on slippery road surfaces are caused by over-application of throttle, especially on curves.



STEP NO. 4 Remove the applier and fasten the inside hook first, then the outside hook. With a little practice the inner hook can be fastened by "feel" without getting under the car.

if you are traveling in those areas known to be "snow belts." As you travel, stay tuned to local radio stations for weather information.

Take along extra clothing (sweaters, slacks, socks, etc.) and a blanket for each passenger, plus some high-energy food—candy bars, cookies, raisins—and perhaps a vacuum bottle of hot beverage or soup. Your car should already contain an ice scraper, a small brush or broom, a flashlight, and a supply of windshield washer antifreeze (in addition to what's in the reservoir).

For distance driving you should add a shovel, a small amount of sand or a couple of burlap bags or a piece of old rug (to help provide traction should you become stuck), some emergency triangles or flares, and a set of tire chains. Incidentally, don't feel you have to carry a couple of bags of sand. The weight has a bad effect on your fuel economy and increases the danger of a spin-out on ice.

Once you're on the road, if it starts to snow heavily or the local forecasts warn that it's going to, consider stopping at a service center or driving into the nearest town to see how the weather develops. If it looks like a long delay, then you're in a better position to seek shelter or overnight accommodation. Don't press on in heavy snow blindly, hoping that "things will be better down the road."

On long trips, try not to let your gas tank get below the half-full mark. If you should find yourself stranded, you would need the fuel to run the engine for warmth from the car's heater. USE EXTREME CAUTION. If you have any doubts whatsoever about the condition of the car's exhaust system, don't run the engine. If you're certain it's in good shape, be sure the car's tailpipe (s) is not blocked by snow and keep a window open on the side of the car away from the direction the wind is blowing exhaust fumes.

Don't run the engine steadily. Five or six minutes will warm the interior of the car. Repeat only when you feel really uncomfortable from the cold. Conserve the gasoline. Most automotive engineers discourage use of auxiliary gas tanks to extend a vehicle's range between fuel stops. Such tanks decrease over-all fuel economy and most often those installed by amateurs endanger vehicle occupants.

You are not likely to be stranded for very long, but it is sensible to be prepared for the worst.

Winter activities open up a whole new bag of pleasures and experiences. And with a little knowledge of special driving techniques, the proper attitude, a well-prepared car, and the few extra items we've mentioned, winter driving can be part of the fun.

(DRIVER thanks David Girling of General Motors for many of the tips in this article.)

DRIVE LINES AND REAR AXLES

Driveshafts and rear axles are super-complicated and the average backyard mechanic shouldn't mess with them. Right? Wrong. They *are* complicated, but by using the correct tools and paying attention to the tech manuals you can do work comparable to a good mechanic and save yourself some bucks in the bargain. Maybe this article can help explain what you're looking at, and what to look for.

DRIVELINE COMPONENTS

A universal joint is a coupling used in a shaft to permit the shaft to rotate through an angle. As the shaft turns, U-joints change the direction of the bend with respect to the shaft.

U-joints are used in the drive lines of all vehicles with movable rear suspension. They are necessary because as the axle moves up and down the angle between the driveshaft and the differential changes. One U-joint is usually located between the transmission and the driveshaft. A few vehicles have another at the rear end. Some cars use U-joints of a constant velocity-type in the center of the driveshaft. These two-piece driveshafts offer an additional plane of movement to the differential, and compensate for the extremely low floor pans in today's cars by effectively cutting the driveshaft length in half.

The rear axle assembly supports the rear wheels and changes the power transmission 90 degrees. To do this, straight-cut bevel or spiral bevel gears were used. The lowering, or offsetting, of the driveshaft brought about a variation of the bevel gear called the hypoid gear. This type of gear does not require a meeting of the gear centerlines and can therefore be underslung relative to the centerline of the ring gear.

The differential's purpose is to provide a means for the rear wheels to turn at different speeds when cornering, and divide the torque between the axle shafts. Let's trace the power flow through a differential.

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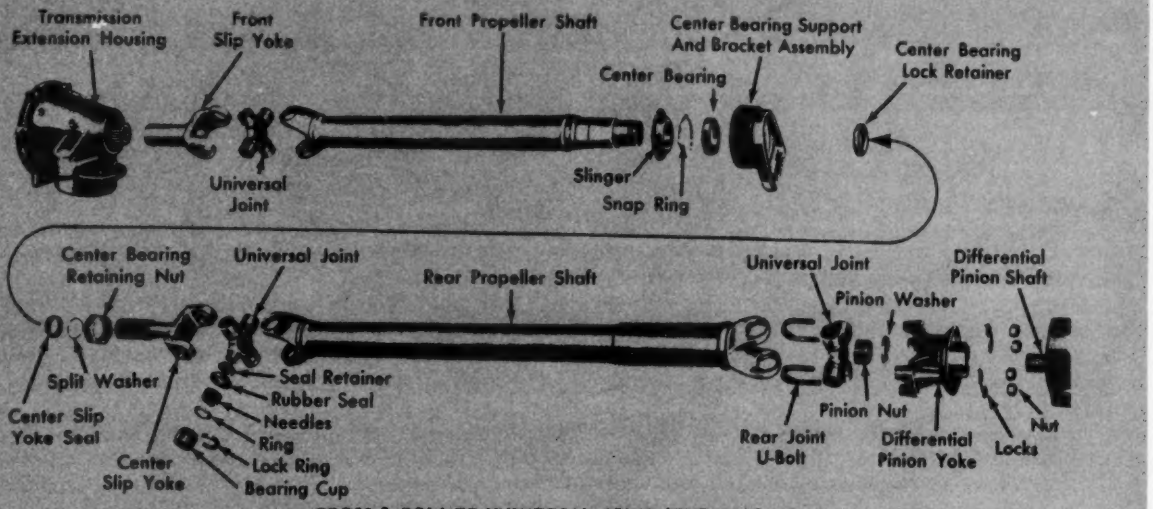
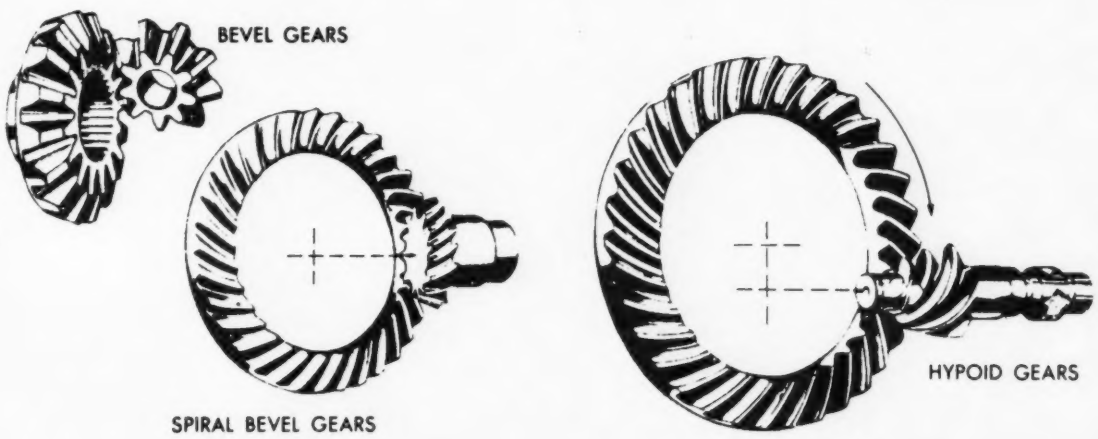


CROSS & ROLLER UNIVERSAL JOINT (TYPICAL)

The constant velocity type of universal joint is normally used in the center of a driveshaft to divide the driveshaft into two pieces. This allows car designers to lower the floor pan and provide a lower profile and racier design for their company's products. CV-joints are also used along with a carrier to provide two short rigid shafts instead of a long one that may flex excessively.

Drawings on pages 19, 22 and 23 courtesy of Mitchell Manuals



Bevel gear application

Hypoid gear application

Bevel and spiral bevel gears are used to change the direction of power transmission 90 degrees. This design was utilized until the lower, sleeker car designs necessitated the development of lower drivelines. To accomplish this lowering, hypoid gears were developed. Hypoid gears don't require a matching of gear centerlines and therefore can be offset or underslung in relation to ring/pinion gear centerlines. Used in conjunction with a two-piece driveshaft, the hypoid gears allow a floor pan to be 3 to 6 inches lower than the bevel gear/one-piece driveshaft arrangement.

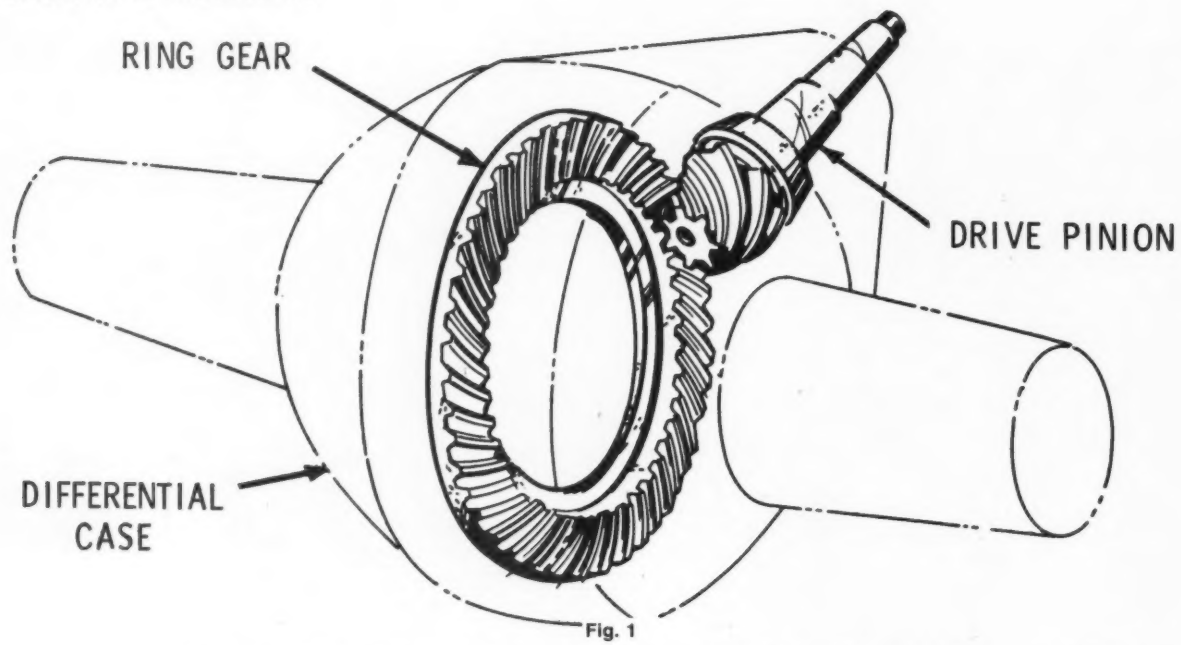


Fig. 1

Axle ratio is computed by dividing the number of ring gear teeth by the number of pinion teeth, i.e., 43 teeth on ring and 11 on pinion = 3.91:1.

1. Driveshaft turns drive pinion which in turn drives ring gear. (Fig. 1)

2. The ring gear, which is bolted to the differential case, rotates the case. (Fig. 2)

3. Differential pinion forces pinion gears against side gears. (Figs. 3-4) (In cases where both wheels have equal traction, the pinion gears do not rotate on the pinion shaft because the input force of the pinion gears is equally divided between the two side gears. Consequently, the pinion gears revolve *with* the pinion shaft although they don't revolve *on* the pinion shaft itself.)

4. The side gears, which are splined to the axle shafts and meshed

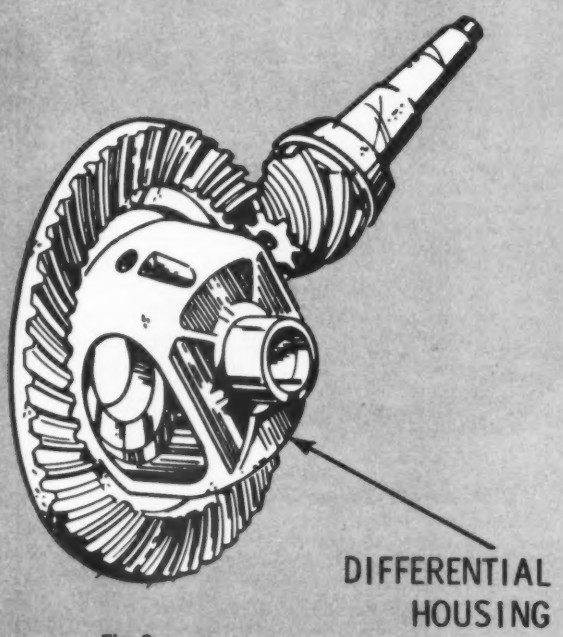


Fig. 2

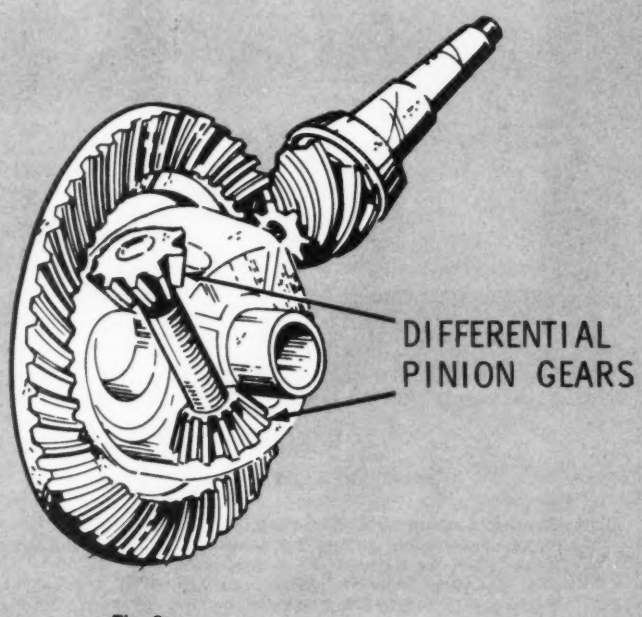


Fig. 3

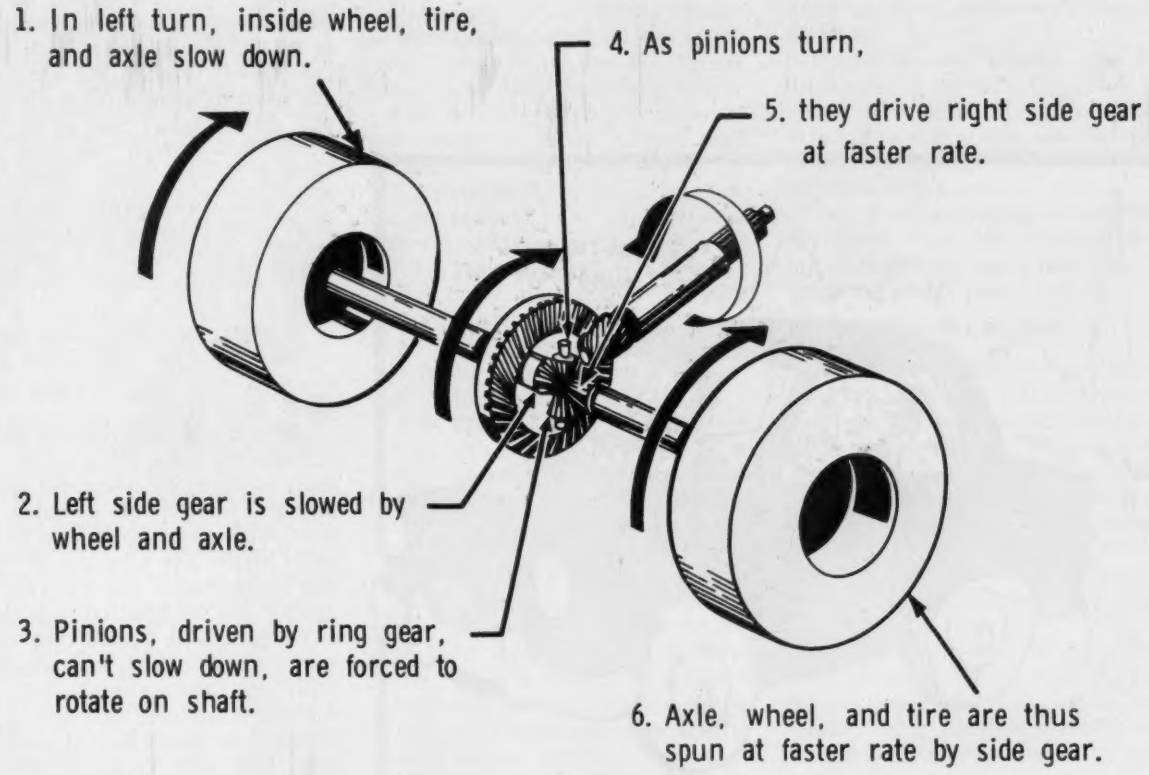

1. In left turn, inside wheel, tire, and axle slow down.
4. As pinions turn,
5. they drive right side gear at faster rate.
2. Left side gear is slowed by wheel and axle.
3. Pinions, driven by ring gear, can't slow down, are forced to rotate on shaft.
6. Axle, wheel, and tire are thus spun at faster rate by side gear.

Fig. 6

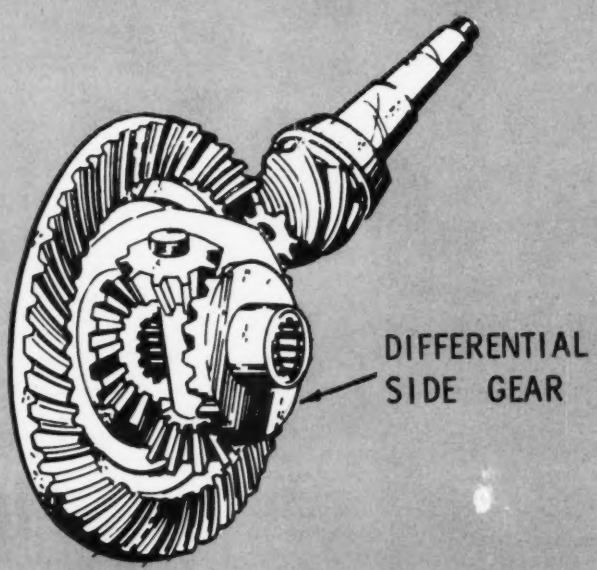


Fig. 4

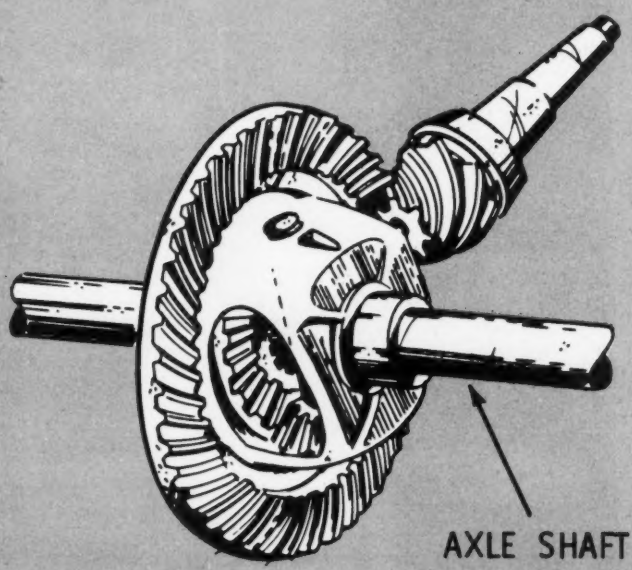
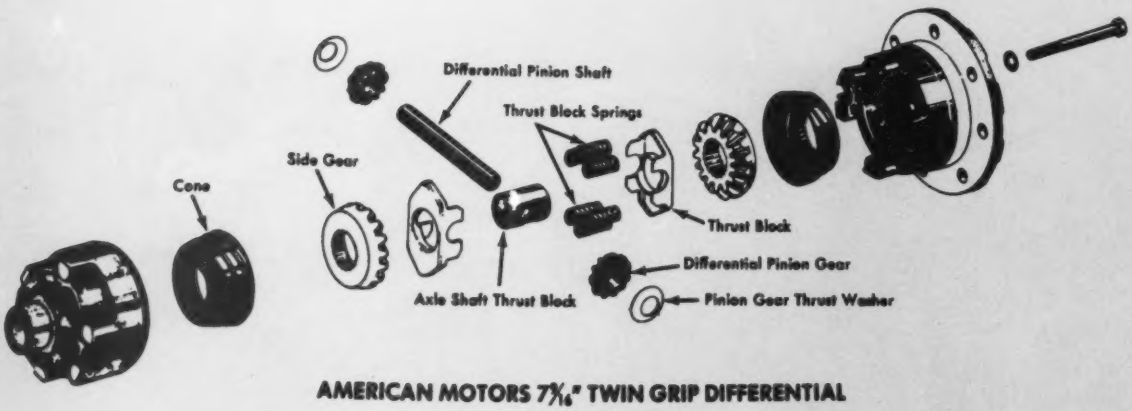


Fig. 5

with the pinion gears, rotate the axle shafts. (Fig. 5)

When you turn a corner, the rear wheels rotate at different speeds due to the different distances each wheel must travel. (Fig. 6) We accomplish this speed differential (so that's where they get the name) thus: as the inner wheel slows down, the side gear splined to the inner wheel axle shaft also slows down. The pinion gears act as balancing levers by maintaining equal tooth loads to both gears while allowing *unequal* speeds of rotation at the axle shafts. In a turn, for example, the vehicle speed remains constant while the inner wheel slows down to 90% and the outer wheel speeds up to 110%.

Limited slip differentials do essentially the same thing except they apply power to the wheel that has the traction instead of spinning the tractionless one. American Motors and Chrysler use a system in which two spring-loaded thrust blocks bear against the differential side gears and then against tapered cone clutch members. General Motors uses essentially the same system except that they use a two-piece case with spring-loaded cone brakes behind each side gear. Ford uses a slightly different arrangement. "Traction-lok" differ-



AMERICAN MOTORS 7⅜" TWIN GRIP DIFFERENTIAL

General layout of positive-traction differential. The two spring-loaded thrust blocks bear against the differential side gears and then against tapered cone clutches. The clutches, thus preloaded, permit differential action when required for turning corners, and transmit equal torque to both axles when traveling in a straight line. When one wheel tries to spin, the cone clutches provide more torque to the wheel which isn't trying to spin.

entials employ a multiple disc clutch to deliver driving force to the wheel with traction. If you have doubts about how your "positraction" is working, here's how to check it.

FORD: Raise one wheel clear off the floor, install jackstands and block wheels. Use a suitable tool attached to the wheel mounting studs and a torque wrench. With the transmission in neutral, note the torque required to keep the wheel moving through several revolutions (ignore starting torque). The reading should be *at least* 40 ft-lbs. The axle shaft and wheel should turn with even pressure and you should not have any slipping or binding. (Also GM.)

AMERICAN MOTORS: Same as Ford except you measure starting, or breakaway, torque. Readings should be between 80 and 120 ft-lbs.

CHRYSLER CORP: Raise and jackstand so that *both* rear wheels are off the ground. Put automatic transmission models in "park" and standards in first or low. Grip a tire and attempt to rotate the wheel. If you can't move it at all, or only with great difficulty, it's working OK. If either wheel turns easily . . . well, the manual says "remove and repair." This is easier said than done, but with the proper tools and manuals you *can* accomplish the job yourself.

DIAGNOSING REAR AXLE PROBLEMS

Unless you're unfortunate enough to have the rear end fall out in the street, noise will probably be the first clue that there's something wrong.

First of all, you've got to isolate and identify the noise. All you need for this is a friend and a smooth road. For *testing purposes only*, increase the tire pressure to 45 psi. This will alter the normal sound of the tires but not the sound of bad components. With a friend driving, sit in the back seat and listen. Noises can tell the story. Don't forget to lower the pressure in the tires when you're through with the road test.

Axle noises usually fall into two categories – gear noise and bearing noise. These noises can be caused by bad wheel bearings, out-of-balance driveshaft, worn or faulty U-joints, worn differential or pinion shaft bearings, or scored pinion or ring gears.

Rear wheel bearing noise is a vibration or growl which can be noticed either with the car coasting or under power. An overheated and hardened (brinnelled) bearing will also cause a click or knock every two revolutions of the rear wheels.

Differential side gears and pinions seldom cause noticeable noise because their movement is small during straight-ahead driving. Their noise is more pronounced during cornering.

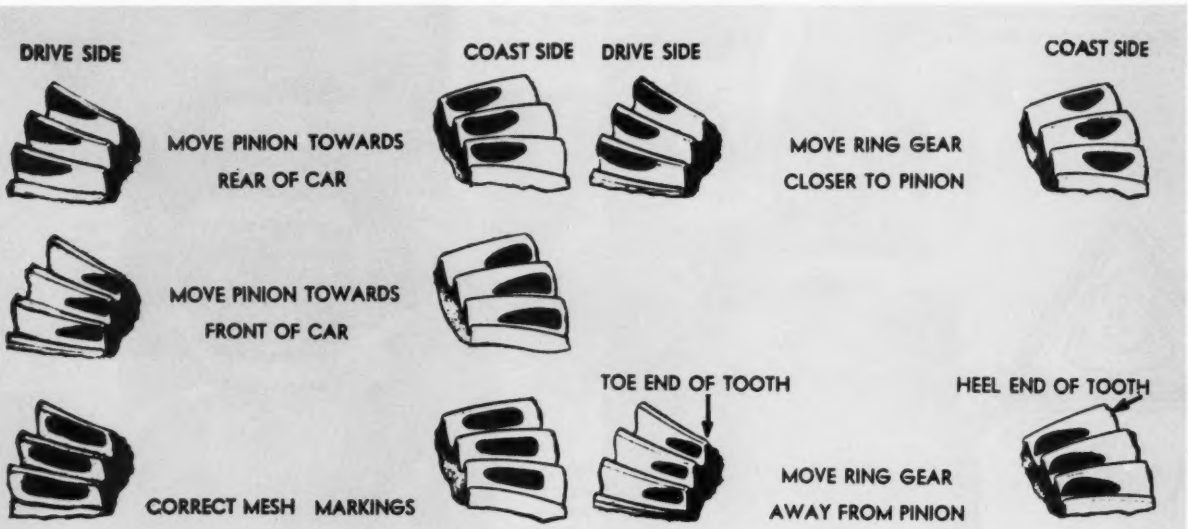
Pinion bearing failures can be distinguished by their frequency or speed of rotation. Rough or brinnelled pinion bearings cause a continuous low pitched whirring or scraping beginning at low speed.

Side bearings produce a constant but slower noise than a pinion bearing. Side bearing noise may vary in frequency when rounding a corner.

THE HOBBY SHOP CAN HELP

The people who run the auto hobby shop are usually the best ones to turn to if you're having trouble diagnosing mechanical problems. By and large they are skilled individuals and are usually willing to provide instructions to the backyard mechanic. The hobby shop also possesses special tools such as the bearing pullers and hydraulic presses necessary to rebuild universals, etc.

With the assistance of the hobby shop personnel and the shop manuals you can come away with both the satisfaction of a job done correctly and a couple of unspent bucks in your pocket.



Ring and pinion gear tooth contact pattern

When you pull off the differential cover (after draining the lubricant into a proper receptacle of course), you can observe the condition of the ring gear. By using this chart you can diagnose ring and pinion gear positioning. "Drive" side refers to the surfaces of the ring gear that are contacted by the pinion during acceleration and cruising. "Coast" refers to the surfaces contacted during deceleration.

Dear Santa Claus

It's Christmas shopping time again. Whether you have a dollar to spend or a hundred, you can find a gift to contribute to the safety and pleasure of any motorcyclist, driver or bicyclist you want to play Santa for . . .

Unless they bought bikes in 1975, bicycle owners probably will need pedal and spoke reflectors to conform to federal safety standards in '76. How about a gift of yellow reflectors that can be added on the front and back edges of pedals?

Christmas shopping will probably clobber your gasoline budget, so tip off St. Nick to leave a vacuum gauge in your stocking. This decorated model at about $20 has a special face reading "Poor, Fair, Economy Zone, Deceleration Zone." If you heed the needle, it'll tell you how to drive for best gas mileage. Less expensive gauges are available.

(right)

Any motorcyclist will love a new pair of boots with steel toe caps and shanks, reinforced and padded to protect legs as well as feet. These stylish kickers run from $60 to $80.

Even the guy or gal who has everything probably doesn't have a burglar alarm for the car. This 8-inch bell kit at around $21 is installed under the hood, rings loudly if a would-be thief opens the hood, trunk lid, or any door, and won't stop clanging until turned off with a special key. The hood hold-down kit can help prevent thefts of batteries or engine parts, costs under $4.

Here's a deluxe gift for any motorcyclist. Helmets come in a wide range of styles, colors, and prices. Lucky is the rider who gets a gift certificate and can pick out exactly the right one.

A highway emergency kit is a terrific selection for the new driver who hasn't had a chance to acquire these goodies one at a time. This deluxe kit sells for about $8.

Here's something every driver should have but few do. A portable fire extinguisher to carry in the car. Fire extinguishers come in many sizes and prices —read the labels. This dry chemical model costs about $8.50 and the recharge kit $2.50.

Any drag racer can use an electronic engine rpm safety control. For about $45, this one prevents over-revving of the motor, shuts it down in case of a stuck throttle or missed shift.

A fun gift for friends who enjoy finding a jug of "Old Alky" under their tree is this gallon of windshield washer cleaner and anti-freeze. Can't you see the eager anticipation on their faces when they shake a gift-wrapped jug of this ready-to-use mix for removing road film, wiper smudge, grease and bugs? Around a buck.

Light up someone's holidays with a beehive clearance light, stop and tail light, reflector, or a clearance/marker lamp. From 79c to $4 you can please the owner of any pickup, camper, van, motor home, travel trailer, boat, or cargo trailer.

These triangle reflectors are great for carrying in the car trunk. Metal-mounted lenses pick up the headlight beams of an oncoming car and bounce back a bright red light. No maintenance required, costs about $16 for compact kit. Flares do similar job for less money but of course are expendable.

(left)
You can't go wrong giving a cyclist a pair of good leather gloves. Choose a pair that cover the wrists for regular riding and unlined, reinforced-on-the-back types for racing. These shown run from $9 to about $30.

LETTERS TO THE EDITOR

BACKFIRE

Address your letters to:
Editor
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

TWO SIDES TO EVERYTHING

The series you have been running on motorcycle safety and some of the one-sided remarks that you have allowed to appear in "Backfire" leave me no alternative but to retaliate in kind. Just for the record, I own two cars, a standard American and a small European.

As an automobile driver I find motorcycles the most hazardous vehicles on the road today. The vast majority of cycle riders have the idea that traffic laws and etiquette do not apply to them. They think that because of their size, maneuverability and acceleration capabilities they have the right to pass slow-moving or stopped traffic awaiting their turn to proceed.

When the cyclist maneuvers to the head of the traffic line, he will ride off with little regard for conditions affecting normal traffic flow. This fact alone has caused five deaths and numerous injuries in my area during the last three months.

Then there is that other cyclist – the one who gets in close behind a car to use it for a wind break. This sorry #@! invariably finds a spot where the headlight, on bright beam of course, reflects back into the driver's eyes from his own rear view mirror. This happens regardless of the size of the car; the way cycles bounce and wobble around, the light creates a positive hazard and distraction which in today's traffic is no less than murder.

My contention is that some very stringent regulations need to be adopted and rigidly enforced as the only way to improve the general image of the cyclist, which is very low.

Bob N. Hartsfield
MSgt, USAF (Ret)

We hasten to point out that most accidents involving motorcyclists are caused by the motorists' errors, not the cyclists. BUT we do think the street riders who behave as Sgt Hartsfield describes–and we all know there are some who do–should give this matter a little thought. A relatively few rude and careless street riders can give everybody a bad name. Read on for another opinion:

First, my compliments to all at DRIVER for the finest and possibly the most needed publication in the Department of Defense.

Your articles on "See and Be Seen" left out an important fact about motorcycle visibility. A biker who writes for *Road Rider* conducted his own study and found that he had to take evasive action 14 times as often on his own motorcycle as when riding a borrowed police cycle.

It's my theory that the police bike was more visible because it represents a threat to most drivers ("that cop may give me a ticket for . . . "), while a typical street bike poses no threat at all.

I believe that motorcycles become invisible partly because the auto driver knows that he is not physically endangered by their presence. This is another reason for believing that the only way to ride in traffic is in a state of fear. This fear takes away a lot of the fun of street riding but enough fun is left to have kept me riding for the last 18 years and perhaps for the next 30 if . . .

Lt COL Abe Low, USAF
AFDSC/GME
Washington, DC 20330

WHAT TO DO

Regarding the discussion about the auto pulling in front of the motorcyclist ("See and Be Seen," August, Fig. 1) with a short time for the cyclist to respond, I suggest the following because I have had similar experiences:

1. Start stopping, *avoid a skid.*

2. At the same time turn the lights off if they are on, on if they're off. One has to be aware that the change can draw attention to the cycle and the driver may act to avoid a collision.

3. Keep watching for an out. The rider may have a chance of going behind or in front of the auto, depending on whether he stops in panic or goes faster to get out of the way. If the cyclist goes behind the car (on a four lane road, two lanes each direction), he should *cut close* to allow any following auto through.

You probably won't have a chance to check behind you. To cut a close margin will also reduce the possibility of going down. Don't cut close in front if the auto is still moving forward.

This may sound like too much to remember in 2.05 seconds, but you

have to realize this is a common accident set-up and you have to think it through *before* it happens. Don't panic. Expect an accident and you'll be safer.

Mr. D. C. Derrick
Gallup, NM 87301

BUMPER HITCHES

While I was looking through your July '75 issue, I came across an erroneous statement. On page 13 under the title "Most Commonly Asked Questions . . ." there is a sentence which says "any vehicle of 1973 and earlier can use a bumper hitch."

Last February I drove my '66 Mustang to a trailer rental dealer to rent a 5'x9' trailer. I was presented with a statement by the rental company saying that because of past accidents they do not allow the rental of trailers to Mustangs that have a bumper hitch. Was this because of the Mustangs' bolt-on bumper?

A Reader
Falls Church, VA

Several readers caught us on this one. Our statement should have been "any vehicle, '73 and earlier, **except** *'65 to '73 Mustangs and '67 to '70 Cougars, can use a bumper hitch." These cars were not equipped with bumpers that could stand the strain of a hitch. A check of major trailer rental companies reveals that you would not be able to rent a trailer from any of them if you planned to tow the trailer with an early Mustang or Cougar equipped with a bumper hitch. We might add that if you shouldn't tow a rental trailer with them, you shouldn't tow your camper or boat either.*

HOW BIG IS "SIZEABLE"?

My neighbor just returned from Iceland and, because his '72 Cortina didn't meet "current government standards," Customs asked for a $600 bond until he brings the car up to standard – the windshield was not tempered glass.

Your article (August, page 19) specifically avoids mentioning the amount of cash bond required to be paid to Customs until '75 cars have their catalytic converters reinstalled.

Unless you give the amount of cash bond required, you are doing a great disservice to personnel who may otherwise be hit at the Port with large, unexpected bills which they cannot pay.

If a large bond will be required, you might do military personnel a favor by advising them to be aware of this before taking a '75 car overseas or bringing one back!

SSgt John E. Knapp, USAF
Plattsburgh AFB, NY 12903

We could not mention the size of the cash bond because we were merely told it was "sizeable." As a result of several letters like Sgt Knapp's, we have asked U.S. Customs for more detailed info to pass along to all you readers.

TIMING METHODS

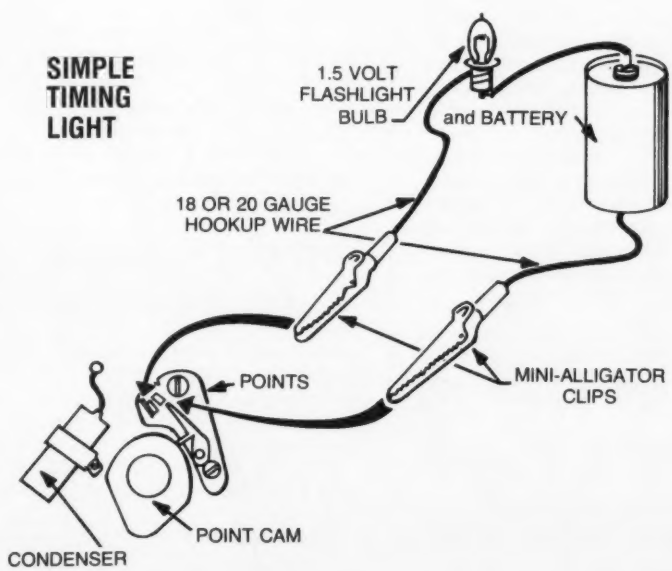
I just finished reading the August '75 issue of *DRIVER* and wanted to comment on the filler about timing motorcycles using a transistor radio.

I've been working on motorcycles for nine years and I've found a method which is simple, cheap, and accurate. All you need is a flashlight bulb, battery wire, and mini-clamps . . .

Assemble as shown and connect across the points. With the spark plugs removed, rotate the engine by either an easy push on the kickstarter or by a wrench on the alternator rotor. Watch the timing marks. As the points open, the light will either go out or grow dimmer *(particularly with some capacitive-discharge systems. ED)* The light should go out as the timing marks align. If not, readjust the points. On the popular Honda 350 it's easy to disconnect the points from the rest of the system by simply unplugging the terminal at the condensers under the tank. This way the points are isolated and the light will go out completely.

This is not to say the transistor radio method is useless. I suppose if you're truckin' down the highway listening to the radio and you want to do a tune-up . . . .

Sgt Patrick J. Lundergan
MacDill AFB, FL 33608



continued from page 2

Double Clutch

Now, here's the information you've been reading the column to find. Motorcycle registration on an Air Force installation is dependent on one thing . . . a properly qualified operator. For instance, if you have a valid state motorcycle license or motorcycle endorsement to your driver's license, are properly insured, have no traffic violations which would preclude normal base registration, and have a legal motorcycle, then you may register and ride that motorcycle on base. A commander may require you, *after registration*, to demonstrate your proficiency to his satisfaction (by either a motorcycle class, skill test, or both) but he may *not* make registration contingent upon your completion of a prescribed course. If you fail the base testing, you may be required to test again, but base registration can neither be removed from nor denied to you because of your base test failure.

If an individual possesses a driver's license from a state which does not require a motorcycle license or endorsement, then he may be required (dependent on base policy) to successfully complete a base motorcycle test prior to base registration.

Again, let us state that base registration and education programs were not designed to intimidate the motorcyclist. They only augment state procedures and are a logical extension of a commander's accident prevention policies. The motorcycle courses were designed to familiarize new arrivals with unique local motorcycle hazards and to provide newer motorcyclists with some riding tips that just may save their lives.

Let's face it. Motorcycles and motorcyclists *do* have a high accident rate, and *any* actions taken to lessen these rates can only be considered, by mature individuals, to be a positive contribution to the safety and well being of our service people.

Motorcycle Springs

The springs have sprung . . . or, how do you pick the right rear springs for your scooter?

There isn't any clear-cut answer, but one thing is certain: the best damper unit in the world may be mismatched to your bike without the proper spring. Choice of spring rate varies with terrain, type of riding, rates of speed, tire type, etc. The following spring rate formula is a start:

$$R = \frac{MY}{4}$$

So therefore let

R = recommended spring rate
M = sum of 65% machine weight and 50% rider weight
Y = swing arm length from pivot to axle eye, divided by swing arm length from pivot to lower shock eye

For instance:

The rider weighs 180 lbs. Bike weight is 245 lbs (wet, i.e., filled with gas and oil but minus rider). Distance from swing arm pivot to axle is 18". Distance from swing arm pivot to lower shock eye is 15".

So:

MY = 65% 245 + 50% 180 = 249.25
M = 18 ÷ 15 = 1.2
Y = 249.25 X 1.2 = 299.1

$$R = \frac{MY}{4} = \frac{299.1}{4} = 74.8 \text{ lbs}$$

spring rate

In the above example, a 75 lb single rate spring is called for; or, if the rider prefers, a progressive or compound spring of 60/90 ($\frac{60 + 90}{2} = 75$).

About Miss DRIVER

(See page 13)

Sandra Jorgacs is traffic manager for a radio station. Of course, that's not the kind of traffic DRIVER is interested in, but we think Sandi is a mightly capable girl. When she's not at the station she plays golf and tennis. She must drive well, too. Not an accident or a citation since she got her first license seven years ago!

DWI Convictions Are Expensive

Several recent articles in DRIVER show how costly a DWI conviction can be in terms of your military life and your social acceptance. If those weren't enough to convince you that a DWI conviction is unpleasant, we offer the following proof that it can be disastrous financially as well.

Let's take, as an example, a single male serviceman who is 22 years old and drives a late model mid-sized car. His insurance coverage is normal for a financed automobile: $100,000/$200,000/$25,000 medical, comprehensive, collision, and uninsured motorist. His address is in a medium-sized city near a military installation. A DWI conviction stays in the insurance company records for 3 years.

State	Premium/YR No DWI	Premium/Yr with DWI	Cost/Yr DWI	Cost for 3 years
TX	$530	$650	$120	$360
CA	590	990	400	1200
NC	385	1030	645	1935

Best Go On Back

If you're buying just two new tires, remember they should go on the rear. The driver has direct control over the front wheels through the steering wheel—often aided by power steering on late model cars—but only remote control over the back. Bringing a car under control if a rear tire is punctured usually is more difficult than if the puncture occurs in front. Putting the best rubber over the rear wheels also gives better traction for stopping and cornering on winter's wet pavement.

Artist Position Available

We are looking for a sharp, hardworking USAF graphics technician, AFSC 23171, preferably in the grade of Tech Sergeant. The position is Art Director, USAF Safety Officers' Study Kit. A commercial art background is desirable, with a working knowledge of photography, strip and paste-up, poster design, lithography prep, color separation and a diverse multi-art capability. The slot is a MSgt's so you've got something to shoot for. It's strictly a "board job" with short deadlines and oftentimes pressure projects so only a man who likes a challenging but rewarding experience need apply.

The position is open during the spring of '76 so if you are interested call or write:

Capt. John Richardson, Ext 2113

Editor
Safety Officers' Study Kit
AFISC/SEDAK
Norton AFB CA 92409

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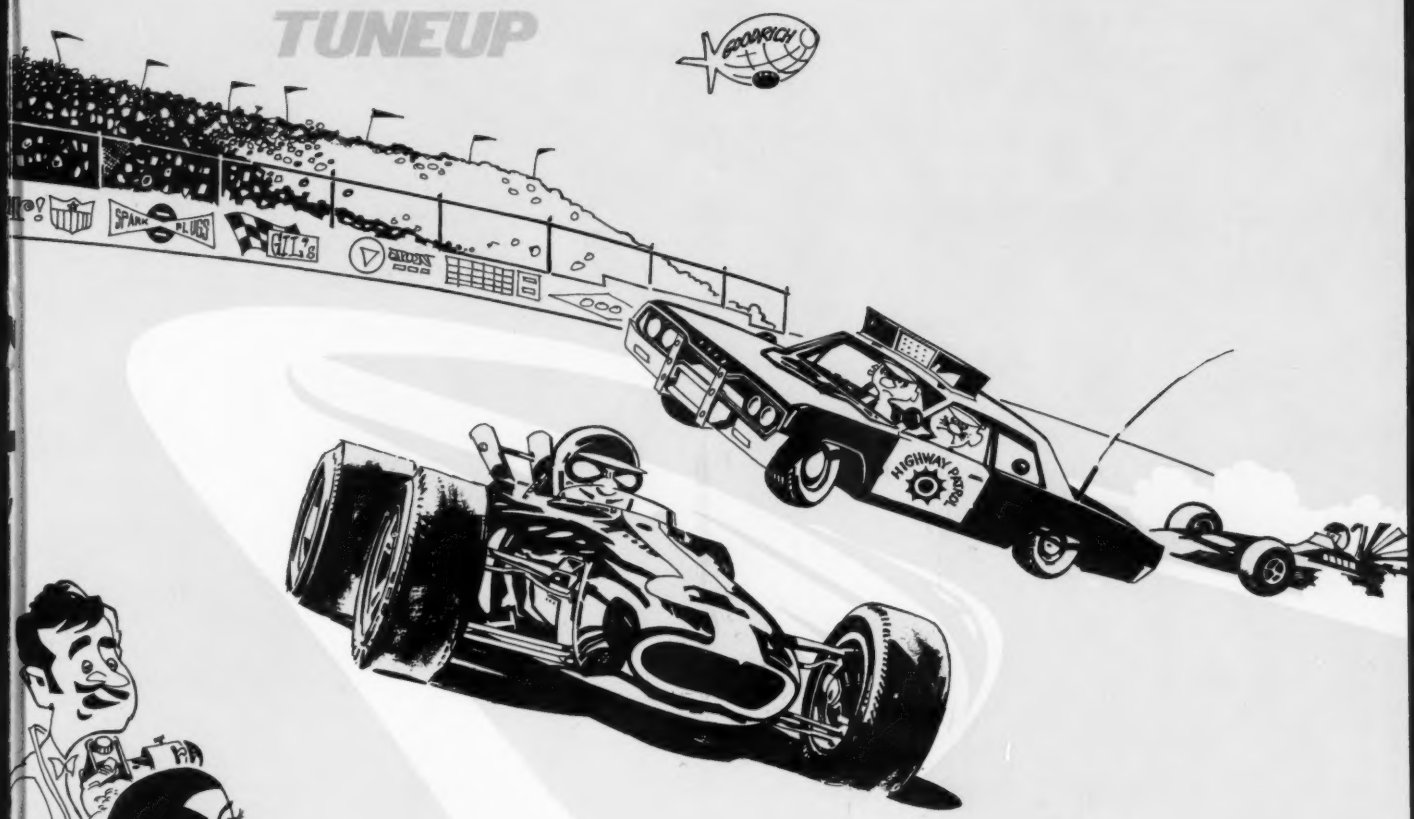
TUNEUP



CAPTION CONTEST

How's your sense of humor? Write a caption for this cartoon. We'll print the funniest one. Send your ideas to:

EDITOR
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

"Call it a car pool if you want to, man, but it's not gettin' on this base!"

EMERGENCY!

STRANDED IN A BLIZZARD!

- Don't sit with the motor running and the windows closed. Deadly and odorless carbon monoxide can seep into the car.
- Keep two windows partly open so fresh air circulates. To conserve gas, run the engine for a short while so that the heater warms the car. Then turn it off until the car begins to get cold.
- Leave parking lights or warning flashers on.
- Don't leave the car. There is a better chance of help reaching you than you surviving on foot in severe weather.
- Attach a bright colored scarf to the radio antenna if you have one.